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According to the records of the U.S. Patent and Trademark Office (USPTO), payment of the maintenance fee for the patent(s) listed below has not been received timely prior to the end of the six-month grace period in accordance with 37 CFR 1.362(e). **THE PATENT(S) LISTED BELOW HAS THEREFORE EXPIRED AS OF THE END OF THE GRACE PERIOD.** 35 U.S.C. 41(b). Notice of the expiration will be published in the USPTO Official Gazette.

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U.S.					
PATENT NUMBER	APPLICATION NUMBER	PATENT ISSUE DATE	APPLICATION FILING DATE	EXPIRATION DATE	ATTORNEY DOCKET NUMBER
5783764	08866893	07/21/98	05/30/97	07/21/10	

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United States Patent [19]

Amar

[11] Patent Number: 5,783,764
[45] Date of Patent: Jul. 21, 1998

[54] PIANOPICS DISPLAY AND ASSOCIATED MUSICAL NOTATION

[76] Inventor: Jean-Claude Amar, 109 Lincoln St., Montclair, N.J. 07042

Related U.S. Application Data

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[21] Appl. No.: 866,893

[22] Filed: May 30, 1997

[51] Int. Cl.⁶ G09B 15/08

[52] U.S. Cl. 84/479 A; 84/464 R; 84/483

[58] Field of Search 84/477 R, 478, 84/479 R, 479 A, 483.2, 464 A

[56] References Cited

U.S. PATENT DOCUMENTS

1,473,495 11/1923 Miller 84/483.2
2,157,168 5/1939 Fine 84/481

3,698,277	10/1972	Barra	84/483.2 X
3,700,785	10/1972	Leonard	84/470 R
4,361,070	11/1982	Huiner	84/478
4,366,741	1/1983	Titus	84/478
4,885,969	12/1989	Chesters	84/478 X
5,574,238	11/1996	Mencher	84/483.2

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[57]

ABSTRACT

A musical keyboard instruction device composed of a pianopics display device and its associated keyboard musical notation, which convey readily the information needed to play the piano and any like keyboard instrument. It does so by using a partial keyboard picture-like diagram to identify the spatial location of the keys to be pressed and the metaphor of a bouncing ball over duration numerals as a timing diagram to indicate the length of the tones and their order of play.

9 Claims, 12 Drawing Sheets

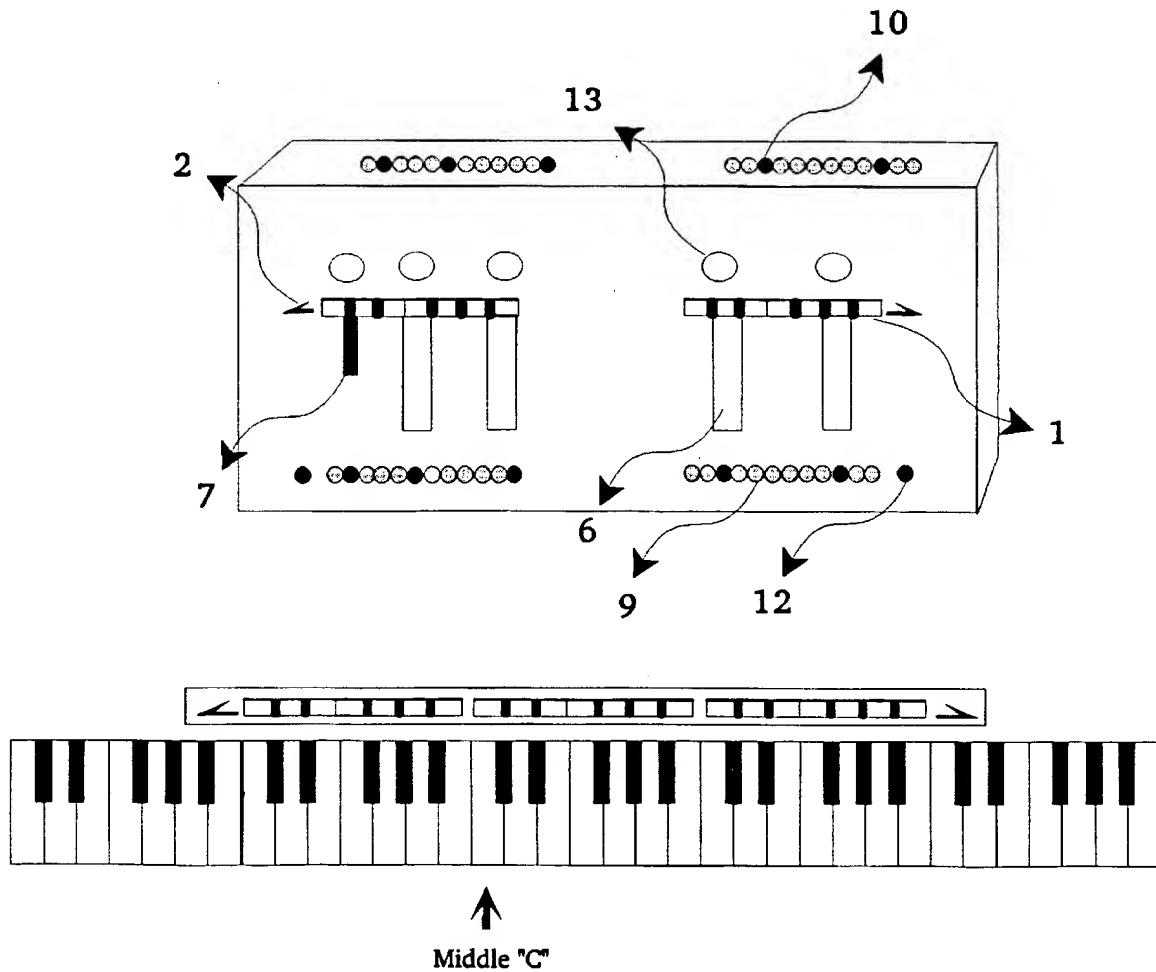


FIG. 1

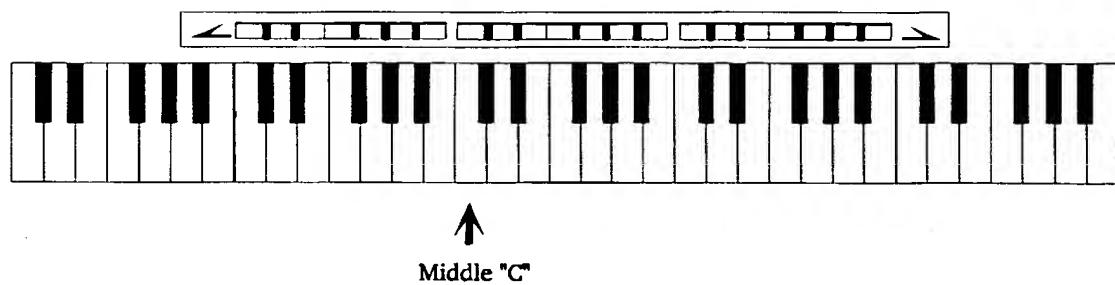
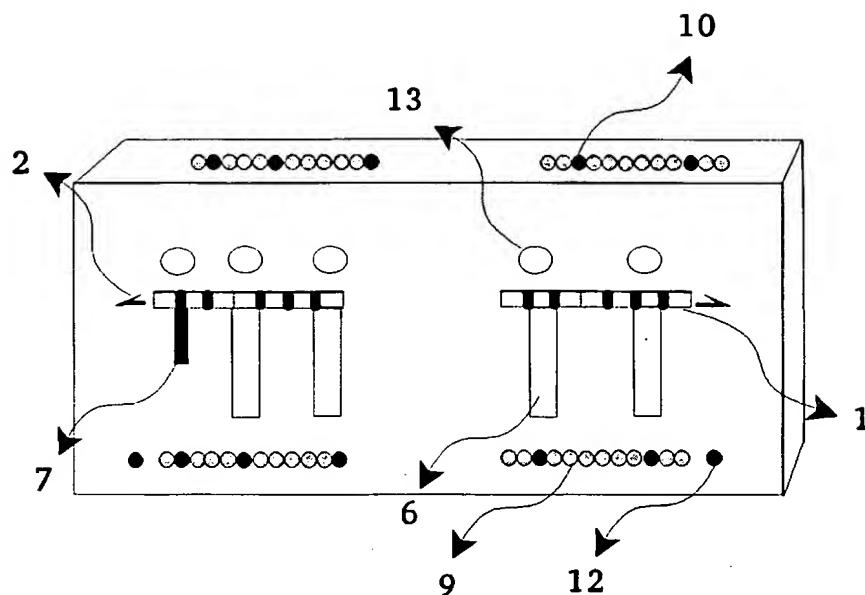


FIG. 2

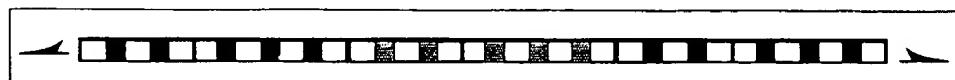


FIG. 13



FIG. 14

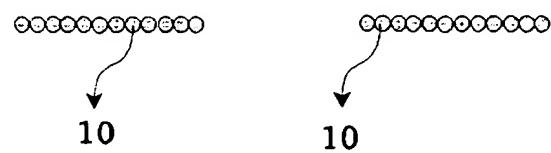


FIG. 3

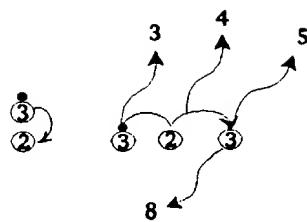


FIG. 5

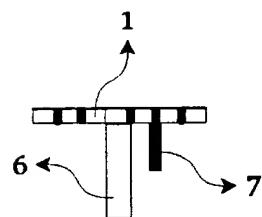


FIG. 9

$T=30$

FIG. 11

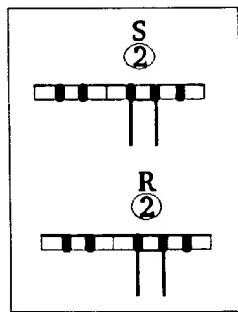


FIG. 10



FIG. 4

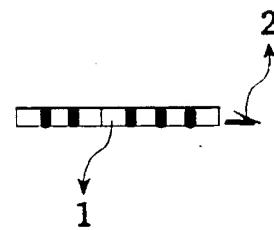


FIG. 6

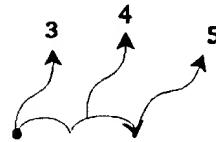


FIG. 8

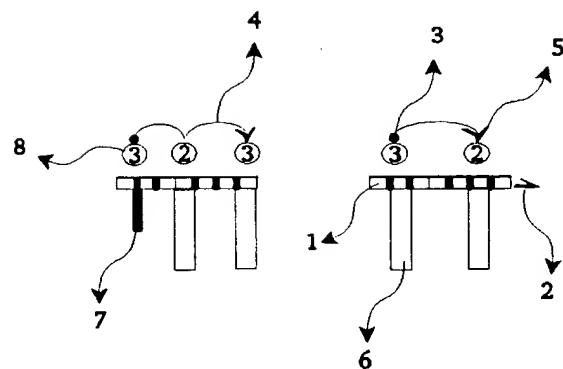


FIG. 7

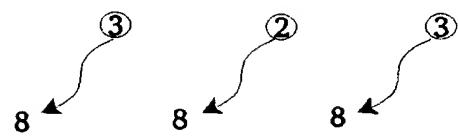


FIG. 12

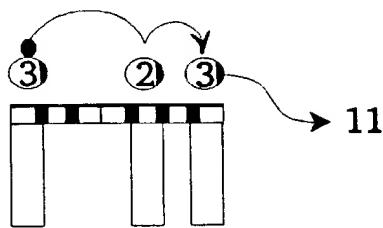


FIG. 15

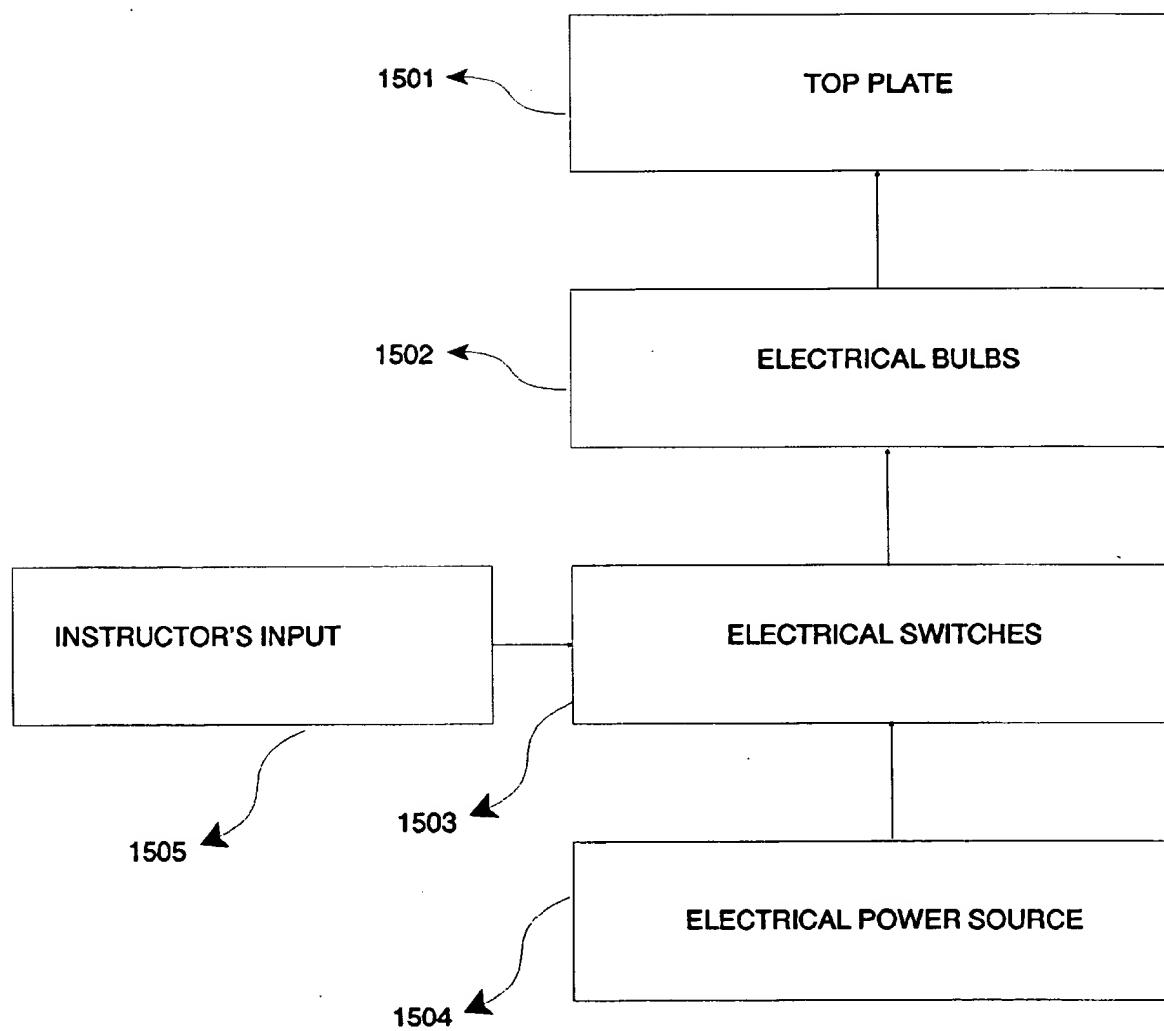


FIG. 16

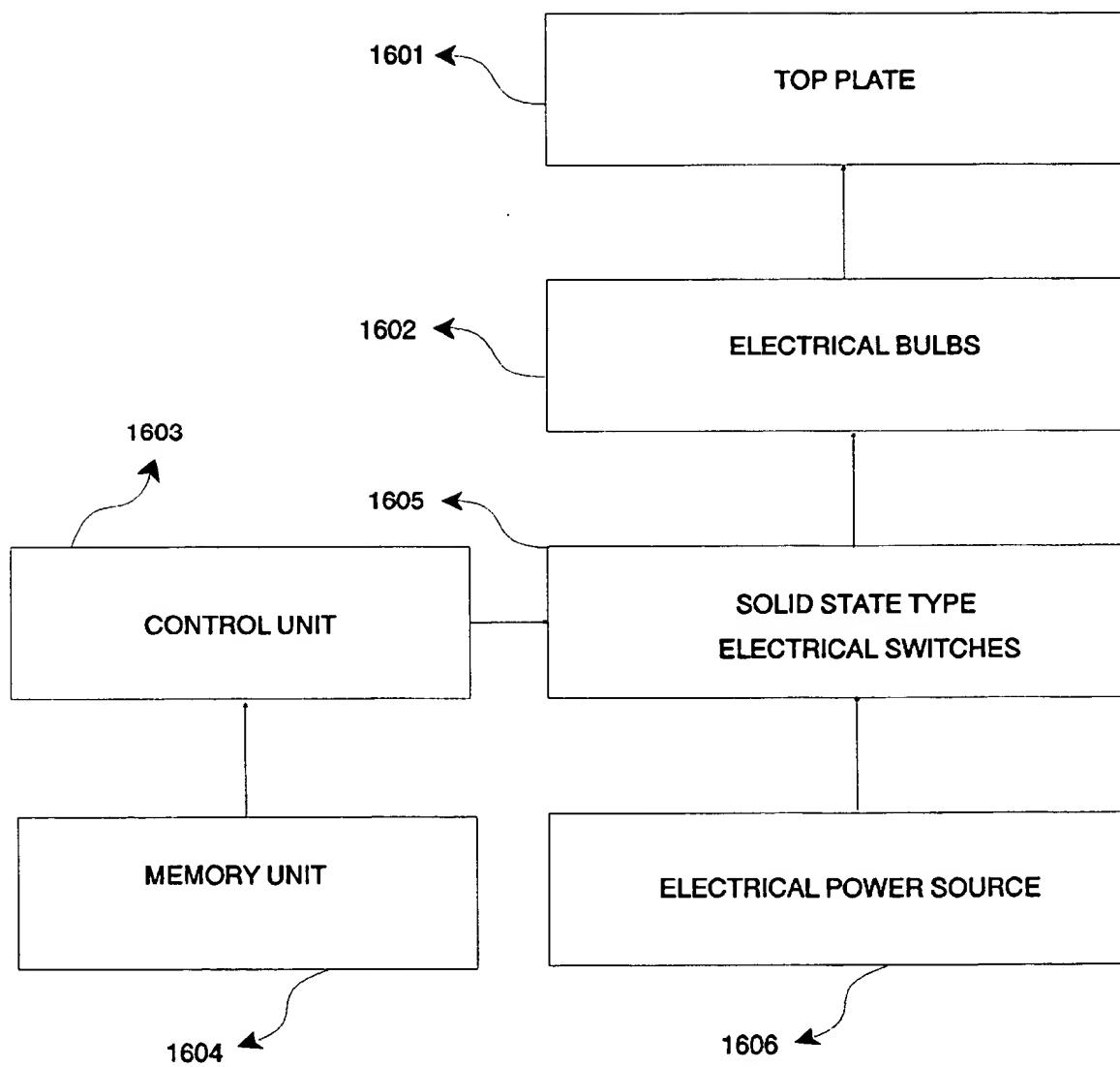


FIG. 17

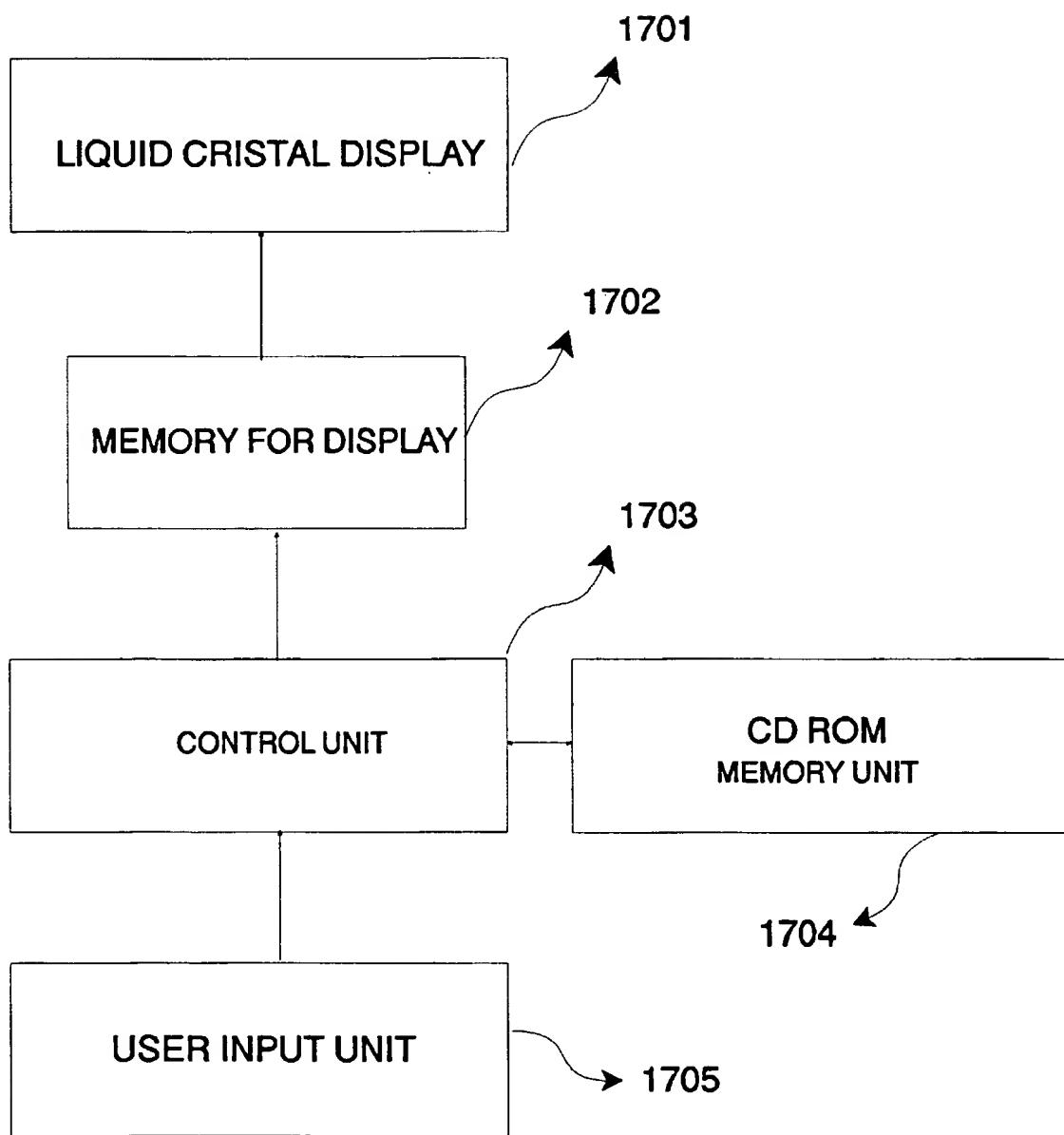


FIG. 18

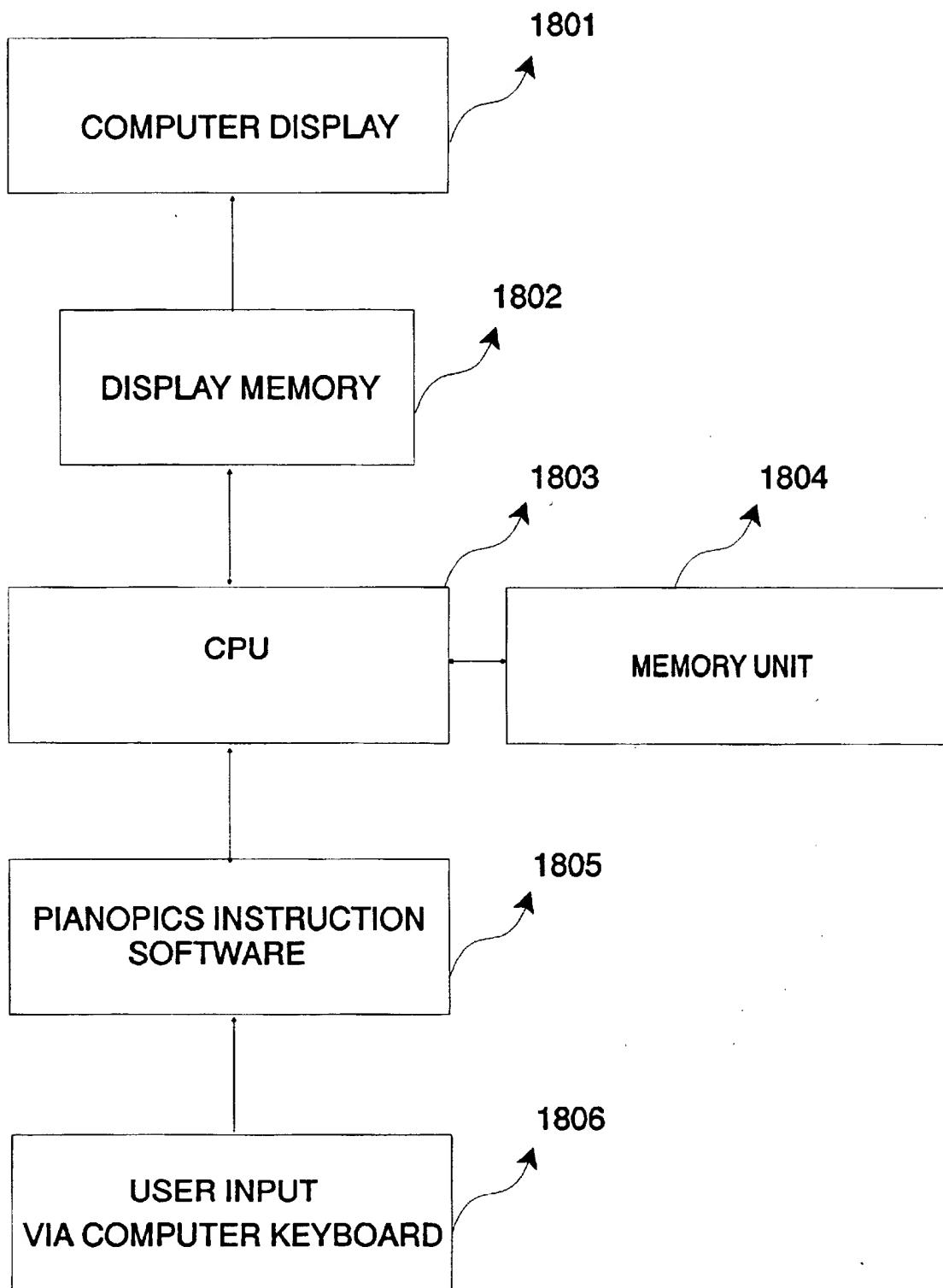


FIG. 19

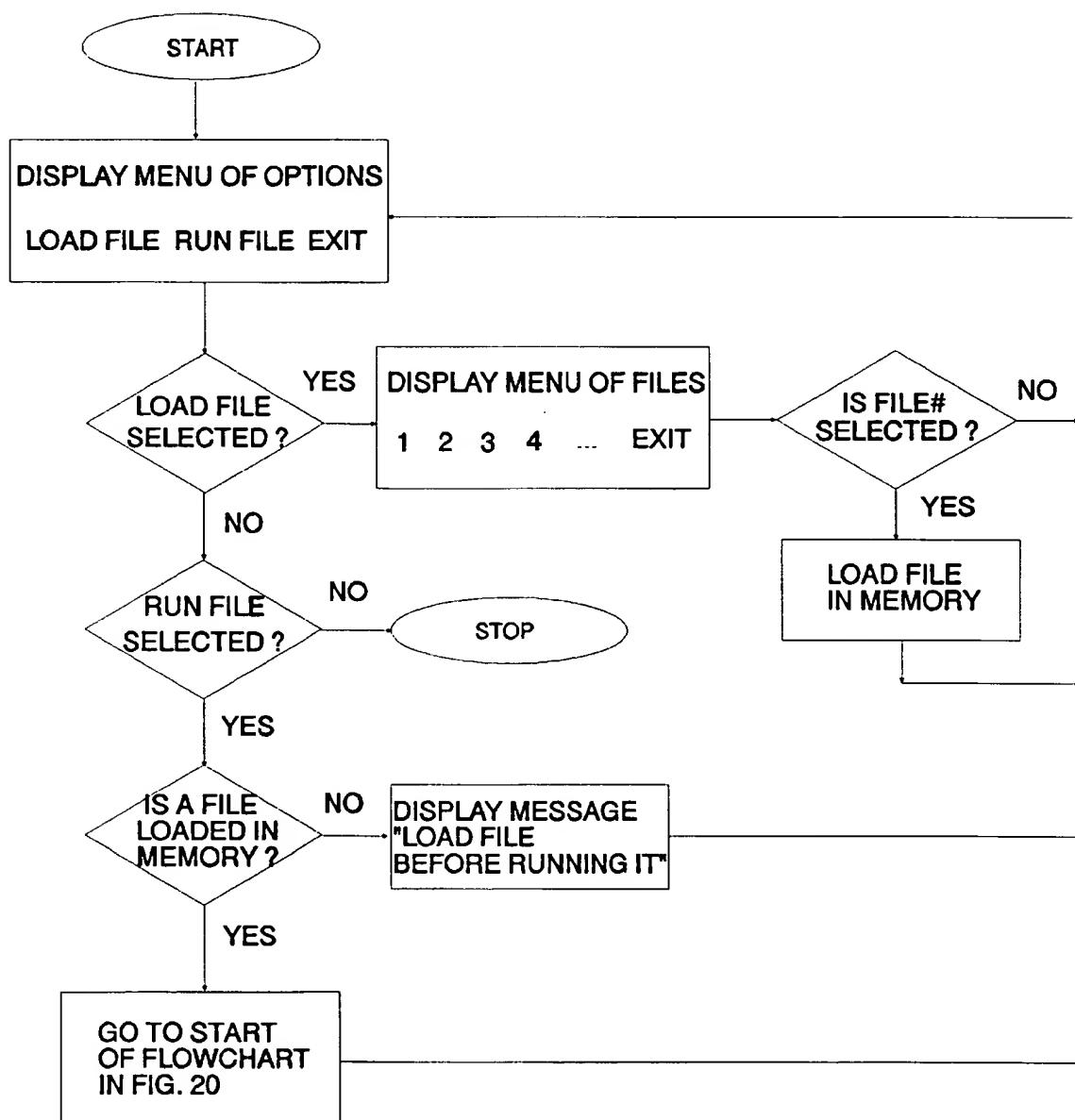


FIG. 20

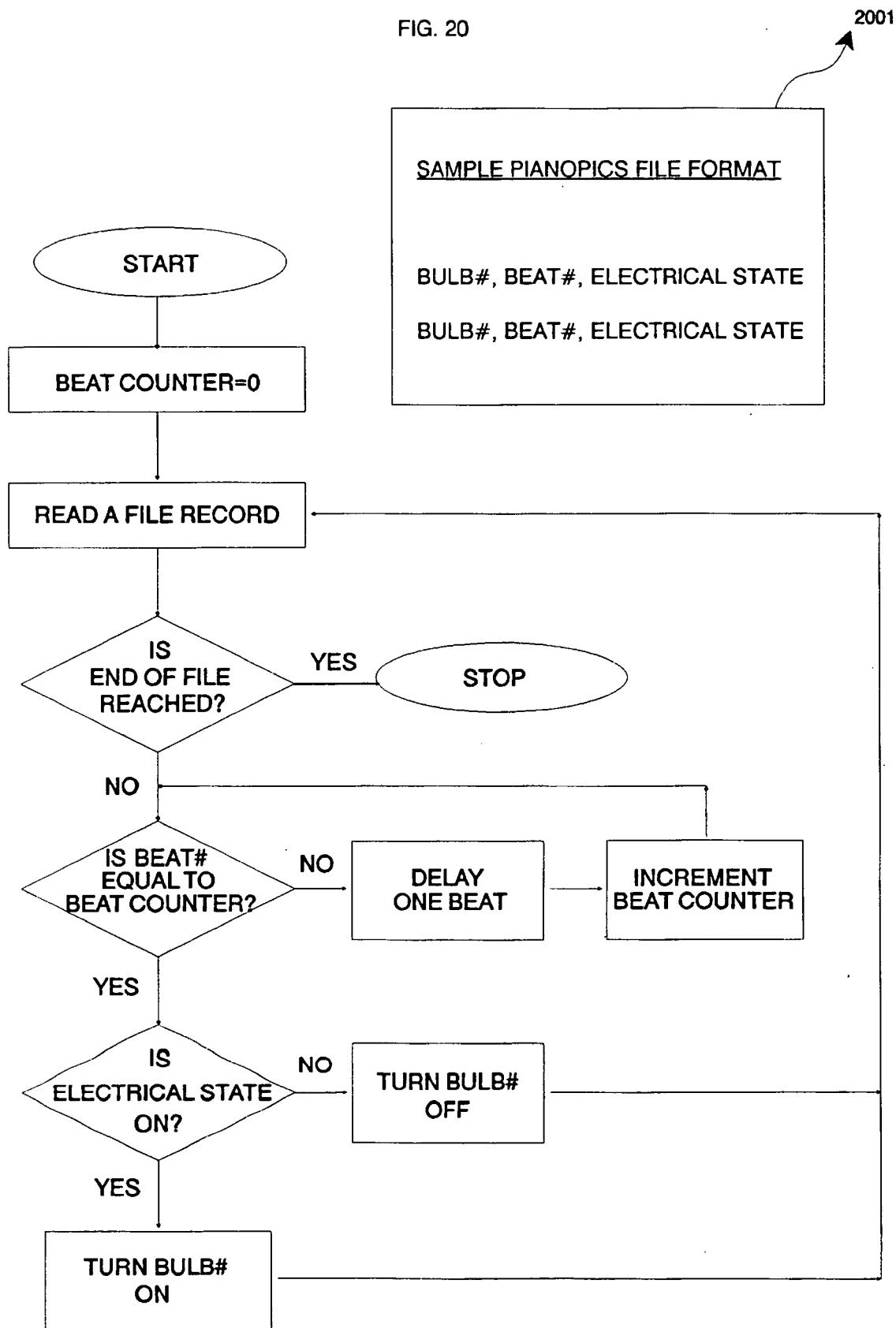


FIG. 21

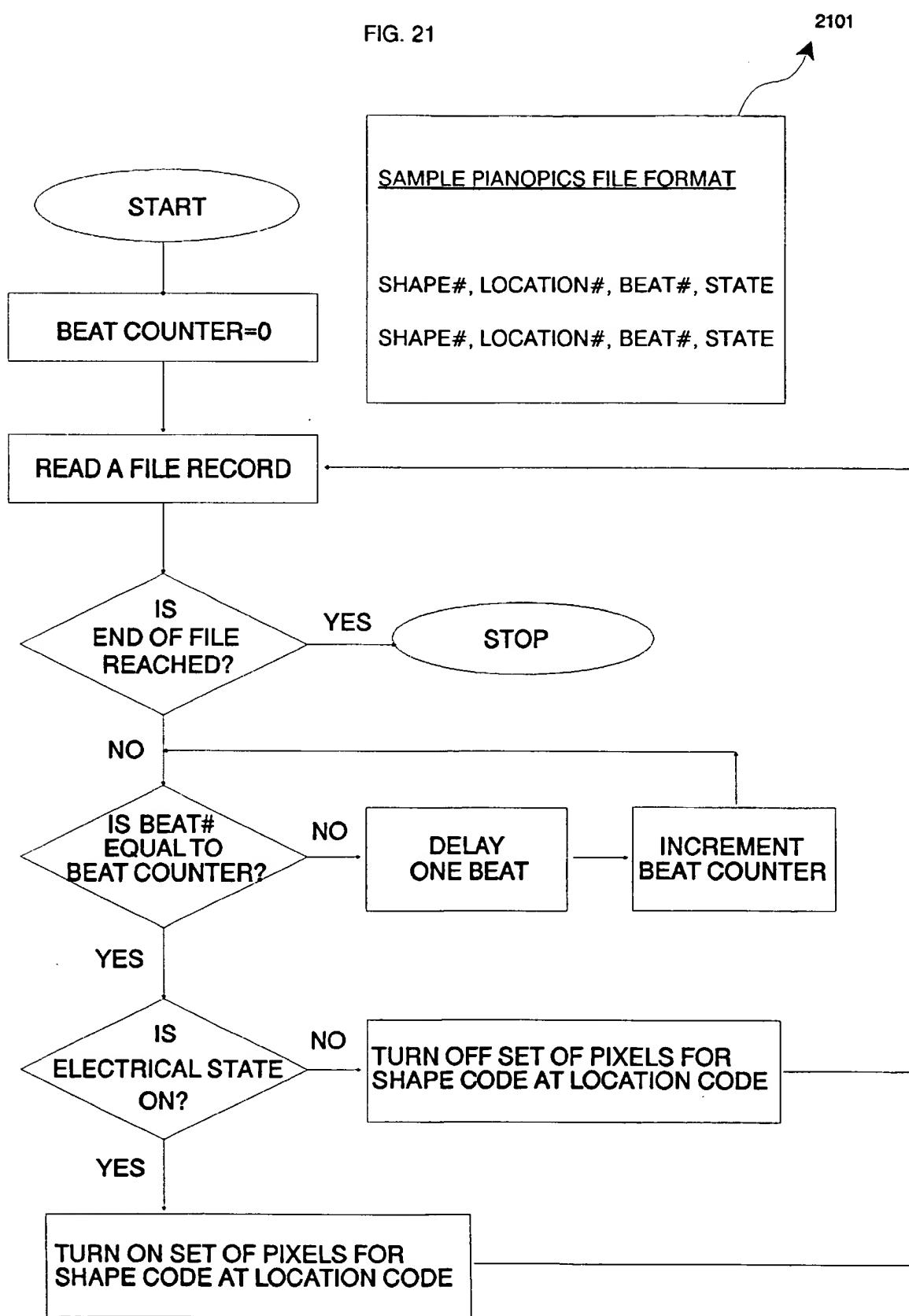
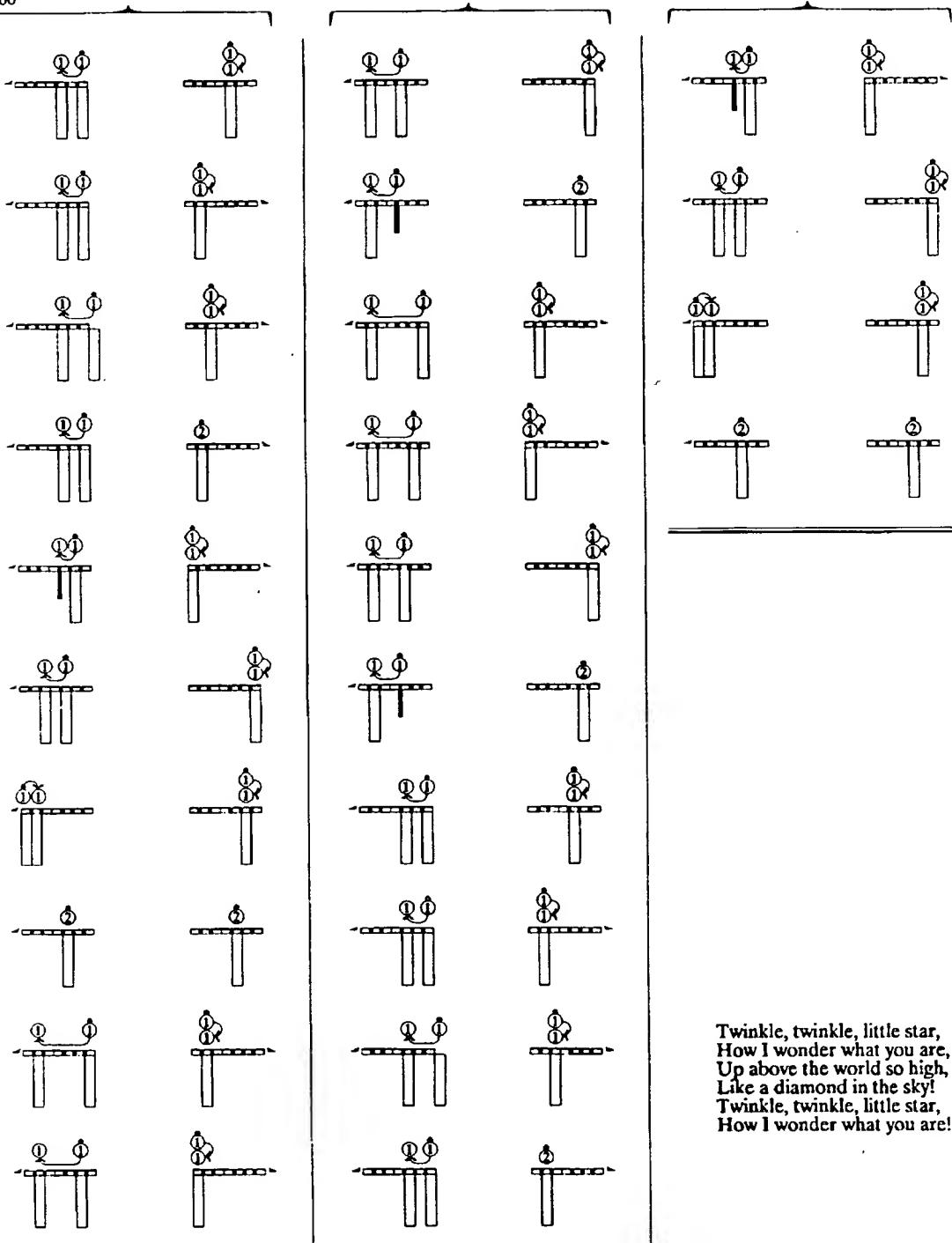


FIG. 22

Twinkle, Twinkle, Little Star
T = 60



Twinkle, twinkle, little star,
How I wonder what you are,
Up above the world so high,
Like a diamond in the sky!
Twinkle, twinkle, little star,
How I wonder what you are!

FIG. 23

America the Beautiful

Slowly **C** **G7** By SAMUEL A. WARD

C **G7**

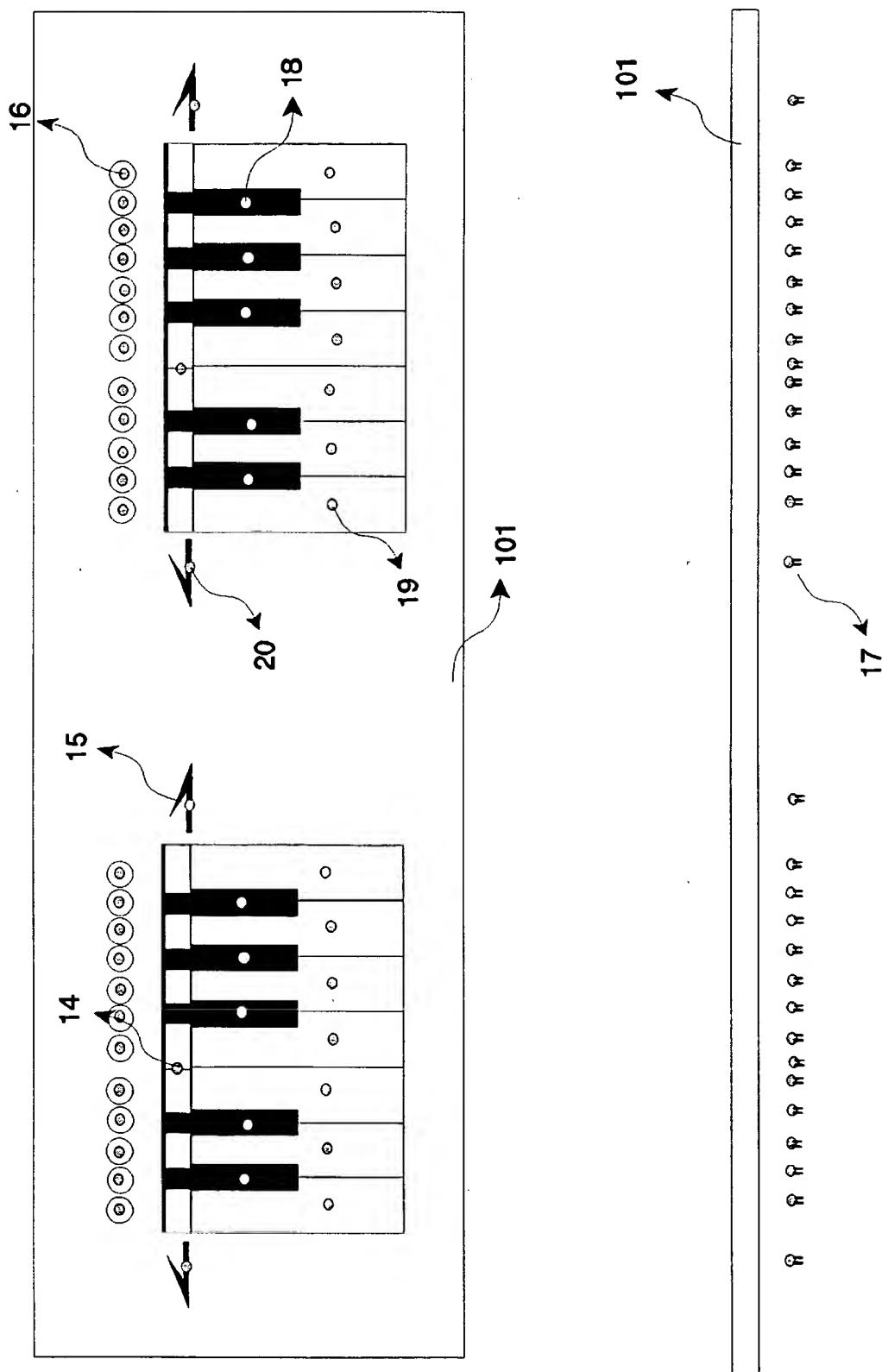
D7 **G** **G7** **C**

G7 **C**

F **C** **F** **G7** **C**

The musical score for 'America the Beautiful' is presented in five staves. The first staff begins with a treble clef, a 'p' dynamic, and the key of C. It features a 'Slowly' tempo instruction and a C chord above the staff. The lyrics 'O beau - ti - ful for spa - cious skies. For am - ber waves of' are written below the notes. The second staff continues with a treble clef and a G7 chord above. The lyrics 'grain, For pur - ple moun - tain ma - jes - ties A -' are written below. The third staff begins with a treble clef and a D7 chord above. The lyrics 'bove the fruit - ed plain. A - *mf* me - ri - ca, A -' are written below. The fourth staff begins with a treble clef and a G chord above. The lyrics 'me - ri - ca, God shed His grace on thee, **p** And' are written below. The fifth staff begins with a treble clef and a C chord above. The lyrics 'crown thy good with bro - ther-hood. From sea to shin - ing sea.' are written below. The score includes various dynamics (p, mf, f) and performance instructions (Slowly).

FIG. 24



PIANOPICS DISPLAY AND ASSOCIATED MUSICAL NOTATION

BACKGROUND OF THE INVENTION

This application claims the benefit of U.S. Provisional Application No. 60/018,919, filed Jun. 4, 1996.

1. Field of the Invention

The present invention relates to a musical keyboard instruction device, its associated musical notation, and a printed ruler to be used by piano teachers and students in order to convey and acquire literacy for the music of keyboard instruments.

2. Description of the Prior Art

Standard music notation includes the familiar five-line staff and notes and is used to play basically all instruments. A consequence of this universality is that it makes it necessary for an aspiring piano player to first mentally determine the note name by its notational symbol and second physically find the note on the keyboard. To further complicate the matter, the same note appears on different locations of different staves. In addition the key signatures alters the relationship between the note seen and the key pressed.

A number of keyboard instruction devices have been devised to help learn the standard musical notation system. A great many number of altogether different music notation systems associated or not with a device have been designed, some successfully like the tablatures for guitar play, but most remained unused.

A dedicated keyboard instruction display and associated music notation that create mental pictures directly usable in order to play the piano and memorize pieces has not yet been devised. Therefore an object of this invention is to provide this and introduce the notion of musical "words" referenced here as pianopics.

SUMMARY OF THE INVENTION

The invention relates to a piano teaching method, a musical keyboard instruction display device, and its associated musical notation showing diagrams which contain necessary and sufficient information about key location, tone length, and the order of the key activation that is used during piano playing. These diagrams follow the forms included in the associated musical notation, and are correlated to the piano keyboard via a scale bars ruler placed behind the piano keys.

It obviates the use of accidentals, and clearly separates the spatial aspect of locating keys on the keyboard from the temporal aspect of the rhythmic activation of these keys.

Furthermore the diagrams, called here pianopics (for piano pictures) appear on the display and on the printed page side by side, maintaining the natural order "left picture for the left hand and right picture for the right hand".

In addition, the same few rules of operation and key assignment apply to the left and right hand pianopics in contrast to the "F" and "G" clefs in the standard notation where for example a "E" note would appear on different lines.

It represents left hand and right hand play in the same way, side by side, and maintains a visual alignment of keys in its vertical arrangement.

It uses a handful of easily remembered intuitive rules to operate.

It provides the pupil with a visual mental picture of a sequence of notes which is useful for memorizing musical pieces.

It never gets congested on the printed page since the tempo indicator handles the speed variations in the play.

It is directly applicable to songs chord accompaniment including Christmas carols, multi-voice choral pieces, and popular music themes.

The advent of keyboard synthesizers now allows a composer to create full orchestrations by using the pianopics notation written side by side for the different instruments.

A definition for the new word "pianopic" referenced throughout this document is as follows: a graphical representation of a musical event involving none, one, or more notes, usually depicted as a scale bar diagram composed of black and white rectangular shapes placed side by side in an arrangement matching the twelve keys of an octave on a piano keyboard, from which hang none, one, or more black and/or white rectangles indicating the actual piano keys to strike. The pianopic may include above the scale bar a timing diagram composed of a numeral on top of each key representation matching the number of beats that key is held down, and a path starting with a dot, ending with an arrow, thus indicating the order in which the keys are struck. The scale bar may show on its left or its right side an octave symbol marker, usually one or more arrows, indicating a shift of one or more octaves respectively to the left or the right from the middle "C" octave located in the center of the piano.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows the pianopics display illuminated for a 2 hand musical sequence using five keys, and a partial piano keyboard and the scale bars ruler slipped behind the piano keys helping correlate the piano keys to be struck with their representation on the pianopics display.

FIG. 2 shows the scale bars ruler.

FIG. 3 shows a couple of timing diagrams.

The first one involves the same note struck twice, the first time for a duration of three beats and the second time for the duration of two beats.

The second diagram involves three notes struck in succession for three, two, and three beats respectively.

FIG. 4 shows a scale bar with one arrow pointing to the right, thus indicating that the playing hand should be shifted one octave to the right of middle "C".

FIG. 5 shows how the keys are represented: a white rectangle for a white key and a smaller black rectangle for a black key hanging from and lined up with their counter parts on the scale bar.

FIG. 6 shows the top portion of a timing diagram, the "bouncing ball" and its path ending with the arrowhead indicating the order in which the keys are to be struck.

FIG. 7 shows three tone length indicators measured in number of beats.

FIG. 8 shows a set of left hand and right hand pianopics as it appears on the printed page, set up in a vertical manner so as to maintain the vertical alignment of the keys.

FIG. 9 shows a tempo indicator of thirty beats per minute, each beat lasting two seconds. This is the setting for a metronome. It is used to change on the fly the duration of the beat unit thus allowing variations in the speed of play while maintaining simplicity in the notation.

FIG. 10 shows a rest which is merely a timed symbol without a corresponding key.

FIG. 11 shows how a tied note is represented. When a key is to be struck in one pianopic and then released in a following one, it appears in both pianopics as (S)ustain and (R)eslease notes. The note duration is the sum of the "sustain" beats plus the "release" beats, here four beats.

FIG. 12 shows how legato play is achieved as notes overlap, that is when the next note starts before the first one is ended. In other words each note involved lasts a little longer than the duration indicated. It is represented by a shadow in the timing circle.

FIG. 13 shows the two banks of toggle switches used to light up the diagrams of the keys as well as the arrows on the display. There is one switch per key/arrow.

FIG. 14 shows the two banks of temporary switches used to light up the timing circles above each lighted key for the desired duration and in the proper order of play.

FIG. 15 is a block diagram of a manually operated pianopics display device according to the invention.

FIG. 16 is a block diagram of an automatically operated pianopics display device according to the invention.

FIG. 17 is a block diagram of a user controlled pianopics display device using a compact disk memory storage medium, a display memory unit, a liquid crystal display type for showing the pianopics shapes, and a user input unit to start and stop the device.

FIG. 18 is a block diagram of a computer system used as a pianopics display device, and running the pianopics method software.

FIG. 19 is a flow chart diagram of the front end of the pianopics software operating on a computer system used as a pianopics musical keyboard instruction display device.

FIG. 20 is a flow chart diagram describing the processing of a pianopics file for the device associated with the block diagram of FIG. 16.

FIG. 21 is a flow chart diagram describing the processing of a pianopics file for the device associated with the block diagram of FIG. 17.

FIG. 22 illustrate sheet music written in the pianopics musical notation system.

FIG. 23 illustrate standard sheet music with the addition of pianopic representations of chords.

FIG. 24 shows a top view of the top plate and electrical bulbs, and a side view of the same.

REFERENCE NUMERALS IN DRAWINGS

- 1 Scale Bar
- 2 Scale bar Arrowhead
- 3 Bouncing Ball
- 4 Path
- 5 Path end Arrowhead
- 6 White key representation
- 7 Black key representation
- 8 Tone length Indicator
- 9 Key toggle switch
- 10 Tone length Indicator temporary switch
- 11 Legato play timing circle shadow
- 12 Scale bar arrow toggle switch
- 13 Timing circle diagram
- 14 Electrical bulb for a scale bar
- 15 Electrical bulb for a right arrow
- 16 Electrical bulb for a timing circle
- 17 Electrical bulb for a left arrow in a side view
- 18 Electrical bulb for a black key shape
- 19 Electrical bulb for a white key shape
- 20 Electrical bulb for a left arrow
- 101 Top plate with predrawn pianopics shapes
- 1501 Top plate of manually operated device with predrawn pianopics shapes
- 1502 Electric bulbs
- 1503 Electrical switches
- 1504 Electrical power source
- 1601 Top plate of automatically operated device with predrawn pianopics shapes

- 1602 Electric bulbs of automatically operated device
- 1603 Control unit
- 1604 Memory unit
- 1606 Electrical power source
- 5 1701 Liquid cristal display
- 1702 Memory for display
- 1703 Control unit
- 1704 CD rom memory unit
- 1705 User input unit
- 10 1801 Computer display
- 1802 Video display memory
- 1803 CPU
- 1804 Memory unit of computer system
- 1805 Pianopics instruction software
- 15 1806 User input via computer keyboard
- 2001 Sample pianopics file format for plate and bulbs type display
- 2101 Sample pianopics file format for LCD or monitor type display

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The musical keyboard instruction display device illustrated in the drawings comprises a box holding five components: an electrical energy source, a set of toggle switches generally designated 9, a set of temporary switches designated 10, a front plate made of a rigid transparent material imprinted with predrawn shapes such as circles 13, arrows 2, rectangles 6 and 7, and finally a set of electrical bulbs each placed behind a plate shape and triggered by the activation of a switch 9 or 10 and its connected wiring thus illuminating that one plate shape. For each shape predrawn on the front plate there is one switch, one bulb, and one wire connecting it to the electrical energy source. The temporary switches 10 are used to light up the circles 13 positioned above the scale bar 1, each one switch 10 is located directly above a key shape. The toggle switches 9 are used to illuminate the white and black rectangles 6 and 7 respectively and are positioned below the keys, one for each key location in the scale bar 1. Extra toggle switches 12 are placed just below the arrows 2 and activate these. The scale bars ruler of FIG. 2 is to be placed behind the keys of a piano or musical keyboard and is meant to help relate the positions of the pianopics key shapes 6 and 7 to those of the actual piano keys by providing a common reference feature. The pianopics display in FIG. 1 is operated by the instructor in front of the pupil. The teacher depresses the toggle switches 9 first in order to light up the keys of the scale bar 1 and the arrows, thus giving the pupil the necessary information to locate on the piano keyboard which keys are to be struck. Then the teacher depresses the temporary switches on top of the display which correspond to the lighted key shapes 6 and 7 for the proper duration and in the proper order thus giving the pupil the necessary information about the rhythm for that sequence of notes. The pupil then replicates this event on the piano, using one's fingers as substitutes for the lighted circles.

In a preferred embodiment of which FIG. 15 is a block diagram, the keyboard instruction display device is a manually operated electro-optical display device comprising a top plate 1501 with predrawn pianopic shapes electrical bulbs 1502, set of electrical switches 1503, and an electrical power source 1504, a system used just as described above, the block diagram of FIG. 15 showing the relationship of its elements.

In a preferred embodiment of which FIG. 16 is a block diagram, the electrical switches 9 are of the solid state type

and are triggered by the control unit 1603, in a predefined sequence following instructions residing in the memory unit 1604, thus automating the teacher's sequence of actions. The memory unit 1604 holds an encoded datafile following the sample pianopics file format 2001. Each data record includes a bulb# corresponding to a specific bulb behind a specific shape of the top plate 1601, a beat# indicating the specific moment in time the event involving the bulb will take place, and an electrical state of ON or OFF indicating the nature of the event: bulb ON or bulb OFF. The control unit 1603 is built with digital circuitry, follows the flowchart of FIG. 20 and processes a data file of type 2001 stored in the memory unit 1604, one record at a time until the end of file marker is reached.

In preferred embodiments of which FIG. 17 is a block diagram, the electro-optical device is a liquid crystal, electroluminescence, plasma, or holographic display device, while the memory unit is a digital storage device such as memory chip, memory card, floppy disk, or CD rom in any combination of display and memory types. The user input unit comprising a set of buttons used to load the memory for display holding the pianopics shapes data, load and start the sequence of instructions residing in the memory unit. FIG. 17 shows a block diagram for a device using a CD rom memory unit 1704 which comprises a number of tracks holding various pianopics data files. These are selected via a user input unit 1705 comprising a set of buttons, one for each track, along with a start button. The control unit 1707 processes one such data file in the format 2101 following the flowchart of FIG. 21 one record at a time until the end of file marker is reached. The liquid crystal display 1701 takes the place of the top plate 1601 and electrical bulbs 1602 of the previous embodiment. Instead of lighting up one bulb for one shape, the system lights up a set of pixels making up the same shape, the coding for which resides in the display memory 1702.

In a preferred embodiment of which FIG. 18 is a block diagram, the musical keyboard instruction device is a computer system running the pianopics instruction software program 1805. This software enables the user to select which pianopics data files of type 2101 stored in the memory unit 1805 to run, and to process it according to the flowchart of FIG. 21. The drawing of the pianopics diagrams on the computer system display 1801 is controlled by codes residing in the display memory 1802 which lights up a set of pixels making up the pianopic shapes. It is performed in a sequential manner so as to simulate the sequence of actions of the teacher using the first keyboard instruction device embodiment in FIG. 15.

The pianopics musical notation in FIG. 8 resembles closely the pianopics musical keyboard instruction display device in FIG. 1 once it has been lit up. However since a timed event occurs when the display is operated as the circles light up rhythmically, the notation reflects this by using numerals 8 inside the circles of FIG. 7 to signify how long each corresponding key is to be held down. The tone length is measured in number of beats. FIG. 6 shows the path diagram representing the order in which the keys are to be pressed. The dot 3 can be thought of as a bouncing ball following the path that ends with the arrowhead. The first key to be pressed is the one which tone duration circle 8 lies below the dot 3. The next key is the one that lies on the path 4 of the bouncing ball and the last key is the one with the arrowhead 5 on top of its duration circle 8. FIG. 3 shows two such timing diagrams, the first one lasting five beats, the second one lasting seven beats. In FIG. 8 two PianoPics are positioned side by side. The one on the left side is to be

played by the left hand and the one on the right side is to be played by the right hand. Both hands start playing simultaneously with the keys 6 and 7 topped by the dots 3. The remainder of the play is dictated by the two timing diagrams 5 and their sequence of beats. In this particular case the right hand stops playing three beats before the left hand does. A music line as is FIG. 8 ends along with the last note played by either hand. The notation represents the succession of pianopics created by the teacher, in a top down vertical 10 fashion. This arrangement maintains the relative alignment of the keys thus helping in the locating of keys when one goes from reading one line to reading the next one. The speed of play, that is the duration of a beat is governed by the tempo indicator of FIG. 9. In this case it is thirty beats 15 per minute, each beat lasting two seconds. This by the way corresponds to the setting on a piano metronome. FIG. 10 shows a PianoPic without a key shape and is used to indicate a rest lasting three beats in this case. Musical slurs and legato play are achieved as notes overlap in their tone durations. 20 that is when each note lasts a little longer than the preceding one. It is indicated in FIG. 12 by a shadow 11 in the timing circle 8 of the notes involved. When a key is to be struck in one pianopic and then released in a following one, a tied note occurs. It is represented in FIG. 11 by a (S)ustain 25 note in the top pianopic and the (R)ease note in the bottom pianopic. The total note duration is the sum of the beats for the (S)ustain and (R)ease notes, in this case it is four beats. (S)ustain notes, like the dotted ones, simultaneously start the play of a pianopic. It will thus be seen that pianopics are to 30 this music notation what words are to the written language. They are made up of notes just like words are made up of letters.

Accordingly, the reader will see that the pianopics display 35 can be used to learn to play a keyboard instrument easily and conveniently.

Although the description above contains many 40 specificities, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the presently preferred embodiments of this invention. For example, the display can include only one hand pianopics generator with or without scale shifting 45 arrows, using permanently lit circled numerals instead of temporarily lit circles, or it might show two or more lines of two hand PianoPics designed to help in developing reading speed.

Also the shapes of all the components used to represent the keys or timing may be different such as ovals, trapezoidal, triangular, or a combination of elementary 50 shapes. In addition, the display could also be the visual part of a computer software program showing on a computer monitor.

Thus the scope of the invention should be determined by the appended claims and their legal equivalents, rather than 55 by the examples given.

What is claimed is:

1. A musical keyboard instruction device for a musical 60 keyboard having a plurality of arrays of keys, each said array having five black keys and seven white keys in a specified order, said device comprising:

an elongate marking device in the form of a multi-scale ruler having opposed left and right ends and comprising three sets of five dark and seven light rectangular shapes matching in width and order the black and white keys respectively of the keyboard, octave symbol markers on the left and right ends respectively of the marking device, the marking device being configured

for placement in proximity to the keys of the keyboard such that the dark and light shapes of the marking device align respectively with the black and white keys of the keyboard; and

a display bearing a musical notation system comprising a plurality of discrete indicia each of the indicia comprising one horizontal scale bar having five dark rectangular shapes and seven light rectangular shapes disposed in the order of the rectangular shapes on the marking device, elongate vertically aligned dark and light key shapes extending down from selected ones of the rectangular shapes of the scale bar in each of the indicia, said elongate key shapes in each of said indicia representing keys of the musical keyboard to be played as marked by the marking device, said indicia further comprising duration symbols aligned with said elongate key shapes and indicating a beat duration for each key identified by said respective elongate key shapes, and order identifying indicia for indicating any required order of playing keys identified in each of said indicia.

2. The musical keyboard instruction device of claim 1, wherein the indicia include an octave symbol marker in proximity to each of said indicia for identifying a selected octave on the keyboard.

3. The musical keyboard instruction device of claim 2, wherein:

the display shows side by side, two of said scale bars corresponding to left and right hands respectively; and, the display further comprises an electrical system including illumination means disposed respectively in the key shapes and in the duration symbols for selective illumination, and a control unit connected to the respective illumination means for selectively illuminating the illumination means to indicate keys to be played and durations for playing keys.

4. The musical keyboard instruction device of claim 3 further comprising a memory unit device connected to the

control unit for storing information to control sequences of the illumination means to be illuminated.

5. The musical keyboard instruction device of claim 4 in which the illumination means comprise at least one liquid crystal display and wherein the memory unit device is a CD rom device.

6. The musical keyboard instruction device of claim 3 in which the illumination means comprise a computer monitor and wherein the control unit and memory unit device comprise a computer system running a musical keyboard instruction software which allows a user to select and load a data file from a removable memory device.

7. A method of teaching piano music comprising the steps of sequentially presenting a student with sets of indicia, the set of indicia presented in each said step being different from the set of indicia in a preceding step, the steps corresponding to particular musical sequences of notes, said indicia presented in each said step comprising a horizontally aligned scale bar having a pattern of light and dark shapes corresponding respectively to white and black keys of a piano.

10 15 20 25 each said set of said indicia further comprising two distinct and separate parts in proximity to said scale bar, one of said parts comprising at least one elongate key shape depending from at least one of said light and dark shapes of said scale bar for indicating precise piano keys to be struck, the other of said parts including numbers and arrows for indicating an order and duration of notes to be struck, said two distinct and separate parts differing from one said step to another.

8. A method as described in claim 7, wherein each said set of indicia is presented sequentially on an electro-optical display device.

30 35 40 45 50 55 60 65 70 75 80 85 90 95 99 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360 365 370 375 380 385 390 395 400 405 410 415 420 425 430 435 440 445 450 455 460 465 470 475 480 485 490 495 500 505 510 515 520 525 530 535 540 545 550 555 560 565 570 575 580 585 590 595 600 605 610 615 620 625 630 635 640 645 650 655 660 665 670 675 680 685 690 695 700 705 710 715 720 725 730 735 740 745 750 755 760 765 770 775 780 785 790 795 800 805 810 815 820 825 830 835 840 845 850 855 860 865 870 875 880 885 890 895 900 905 910 915 920 925 930 935 940 945 950 955 960 965 970 975 980 985 990 995 1000 1005 1010 1015 1020 1025 1030 1035 1040 1045 1050 1055 1060 1065 1070 1075 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130 1135 1140 1145 1150 1155 1160 1165 1170 1175 1180 1185 1190 1195 1200 1205 1210 1215 1220 1225 1230 1235 1240 1245 1250 1255 1260 1265 1270 1275 1280 1285 1290 1295 1300 1305 1310 1315 1320 1325 1330 1335 1340 1345 1350 1355 1360 1365 1370 1375 1380 1385 1390 1395 1400 1405 1410 1415 1420 1425 1430 1435 1440 1445 1450 1455 1460 1465 1470 1475 1480 1485 1490 1495 1500 1505 1510 1515 1520 1525 1530 1535 1540 1545 1550 1555 1560 1565 1570 1575 1580 1585 1590 1595 1600 1605 1610 1615 1620 1625 1630 1635 1640 1645 1650 1655 1660 1665 1670 1675 1680 1685 1690 1695 1700 1705 1710 1715 1720 1725 1730 1735 1740 1745 1750 1755 1760 1765 1770 1775 1780 1785 1790 1795 1800 1805 1810 1815 1820 1825 1830 1835 1840 1845 1850 1855 1860 1865 1870 1875 1880 1885 1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 2065 2070 2075 2080 2085 2090 2095 2100 2105 2110 2115 2120 2125 2130 2135 2140 2145 2150 2155 2160 2165 2170 2175 2180 2185 2190 2195 2200 2205 2210 2215 2220 2225 2230 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5235 5240 5245 5250 5255 5260 5265 5270 5275 5280 5285 5290 5295 5300 5305 5310 5315 5320 5325 5330 5335 5340 5345 5350 5355 5360 5365 5370 5375 5380 5385 5390 5395 5400 5405 5410 5415 5420 5425 5430 5435 5440 5445 5450 5455 5460 5465 5470 5475 5480 5485 5490 5495 5500 5505 5510 5515 5520 5525 5530 5535 5540 5545 5550 5555 5560 5565 5570 5575 5580 5585 5590 5595 5600 5605 5610 5615 5620 5625 5630 5635 5640 5645 5650 5655 5660 5665 5670 5675 5680 5685 5690 5695 5700 5705 5710 5715 5720 5725 5730 5735 5740 5745 5750 5755 5760 5765 5770 5775 5780 5785 5790 5795 5800 5805 5810 5815 5820 5825 5830 5835 5840 5845 5850 5855 5860 5865 5870 5875 5880 5885 5890 5895 5900 5905 5910 5915 5920 5925 5930 5935 5940 5945 5950 5955 5960 5965 5970 5975 5980 5985 5990 5995 6000 6005 6010 6015 6020 6025 6030 6035 6040 6045 6050 6055 6060 6065 6070 6075 6080 6085 6090 6095 6100 6105 6110 6115 6120 6125 6130 6135 6140 6145 6150 6155 6160 6165 6170 6175 6180 6185 6190 6195 6200 6205 6210 6215 6220 6225 6230 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7235 7240 7245 7250 7255 7260 7265 7270 7275 7280 7285 7290 7295 7300 7305 7310 7315 7320 7325 7330 7335 7340 7345 7350 7355 7360 7365 7370 7375 7380 7385 7390 7395 7400 7405 7410 7415 7420 7425 7430 7435 7440 7445 7450 7455 7460 7465 7470 7475 7480 7485 7490 7495 7500 7505 7510 7515 7520 7525 7530 7535 7540 7545 7550 7555 7560 7565 7570 7575 7580 7585 7590 7595 7600 7605 7610 7615 7620 7625 7630 7635 7640 7645 7650 7655 7660 7665 7670 7675 7680 7685 7690 7695 7700 7705 7710 7715 7720 7725 7730 7735 7740 7745 7750 7755 7760 7765 7770 7775 7780 7785 7790 7795 7800 7805 7810 7815 7820 7825 7830 7835 7840 7845 7850 7855 7860 7865 7870 7875 7880 7885 7890 7895 7900 7905 7910 7915 7920 7925 7930 7935 7940 7945 7950 7955 7960 7965 7970 7975 7980 7985 7990 7995 8000 8005 8010 8015 8020 8025 8030 8035 8040 8045 8050 8055 8060 8065 8070 8075 8080 8085 8090 8095 8100 8105 8110 8115 8120 8125 8130 8135 8140 8145 8150 8155 8160 8165 8170 8175 8180 8185 8190 8195 8200 8205 8210 8215 8220 8225 8230 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9235 9240 9245 9250 9255 9260 9265 9270 9275 9280 9285 9290 9295 9300 9305 9310 9315 9320 9325 9330 9335 9340 9345 9350 9355 9360 9365 9370 9375 9380 9385 9390 9395 9400 9405 9410 9415 9420 9425 9430 9435 9440 9445 9450 9455 9460 9465 9470 9475 9480 9485 9490 9495 9500 9505 9510 9515 9520 9525 9530 9535 9540 9545 9550 9555 9560 9565 9570 9575 9580 9585 9590 9595 9600 9605 9610 9615 9620 9625 9630 9635 9640 9645 9650 9655 9660 9665 9670 9675 9680 9685 9690 9695 9700 9705 9710 9715 9720 9725 9730 9735 9740 9745 9750 9755 9760 9765 9770 9775 9780 9785 9790 9795 9800 9805 9810 9815 9820 9825 9830 9835 9840 9845 9850 9855 9860 9865 9870 9875 9880 9885 9890 9895 9900 9905 9910 9915 9920 9925 9930 9935 9940 9945 9950 9955 9960 9965 9970 9975 9980 9985 9990 9995 10000 10005 10010 10015 10020 10025 10030 10035 10040 10045 10050 10055 10060 10065 10070 10075 10080 10085 10090 10095 10100 10105 10110 10115 10120 10125 10130 10135 10140 10145 10150 10155 10160 10165 10170 10175 10180 10185 10190 10195 10200 10205 10210 10215 10220 10225 10230 10235 10240 10245 10250 10255 10260 10265 10270 10275 10280 10285 10290 10295 10300 10305 10310 10315 10320 10325 10330 10335 10340 10345 10350 10355 10360